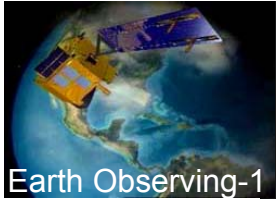


# Section 8

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## EO-1 Lessons Learned / Summary

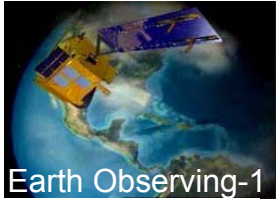


# Lessons Learned (1 of 5)



June 4, 2002

- ◆ ***When compared to a small science mission, NMP missions are inherently RISKY:***
  - *Maturing the technologies*
  - *Architectural risks*
  - *Developing the technologies*
  - *Flight-validating the technologies*
  - *Infusing the technologies*
- ◆ ***Mitigating these risks requires:***
  - *Greater reserves of time and money*
  - *More capable people*
  - *Robust Risk Management*
  - *Strong System Engineering is ABSOLUTELY ESSENTIAL in orchestrating a successful NMP mission*
  - *Ready and repeated access to the best engineering talent is routinely required*

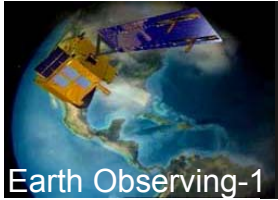


# Lessons Learned (2 of 5)



June 4, 2002

- ◆ *NMP missions are not important in and of themselves, BUT where they lead*
- ◆ *Enabling future science missions is the primary function of any NMP mission*
- ◆ *OMB expects infusion to be direct and obvious*
- ◆ *Effective infusion is a stumbling block for the entire NASA technology program – not just NMP*
- ◆ *However, NMP must solve this problem or die trying*
- ◆ *Flight projects are independent and do not like entanglements with technology providers in other NASA projects*
- ◆ *HQ can encourage infusion, but probably cannot enforce it*
- ◆ *Center management can also encourage infusion, but is not inclined to push too hard*
- ◆ *It probably falls to Programs to manage infusion*
- ◆ *To be effective, programs need to have some influence on technology development and validation prior to infusion*

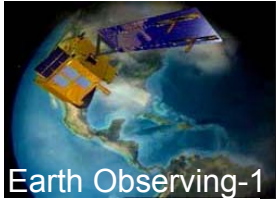


# *Lessons Learned (3 of 5)*



June 4, 2002

- ◆ *Who should do an NMP mission?*
- ◆ *So far, ONLY JPL and GSFC have had successful NMP missions*
- ◆ *All NMP mission get into trouble due to their higher risk*
- ◆ *With a “deep bench” of engineering expertise, you solve the problems and move on*
- ◆ *Without this engineering expertise, you may stall out and be cancelled*
- ◆ *With all of these difficulties, are NMP missions worth doing?*

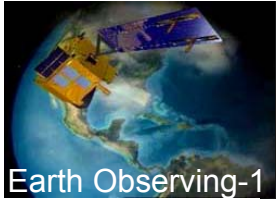


# Lessons Learned (4 of 5)



June 4, 2002

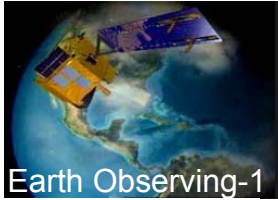
- ◆ ***The jury is still out, but based on the testimony we heard:***
  - *Infusion must become more sophisticated than “Build it and they will use it”*
  - *Infusing into a single large mission will rarely save enough money to pay for the NMP mission*
  - *Infusing into multiple missions works best at the box level*
  - *Hence, the NMP is being turned into a Multi-mission Box Program*
- ◆ ***Large science missions that are critically dependent on new technologies will include their own flight validation mission in their planning***
- ◆ ***Small science missions are not generally good infusion targets for new technologies because of strict cost caps and modest reserves***
- ◆ ***The NMP must become much smarter about its infusion targets***



# Lessons Learned (5 of 5)



- ◆ ***What have we learned from EO-1?***
  - ***Technology validation missions are risky and difficult***
  - ***In the right situation and in the right hands, they can be affordably successful and valuable to one or more future science missions***
  - ***In the end, these missions are justified because they are programmatically necessary and not because they are cost-effective***
  - ***Most will be associated with large science missions that are critically dependent on new, unvalidated technologies***



# Summary



June 4, 2002

- ◆ ***The EO-1 mission is responsive to the 1992 Land Remote Sensing Act wherein NASA will use advanced technology to ensure Landsat data continuity***
- ◆ ***It has convincingly flight-validated improvements in:***
  - *Multispectral imaging*
  - *Hyperspectral imaging*
  - *Calibration*
  - *Atmospheric Correction*
  - *Spacecraft technologies useful to remote sensing*
- ◆ ***The baseline mission has been completed and is now in an Extended Mission based on a partnership with the USGS***
- ◆ ***It now functions as an orbital testbed for new applications***
- ◆ ***The best may be yet to come!***
- ◆ ***Selected EO-1 imagery and this presentation are available at <http://eo1.gsfc.nasa.gov/miscPages/home.html>***